BONNEVILLE POWER ADMINISTRATION
FIBER-OPTIC CABLE PLAN

May 24, 2000

Reader's Guide

The following pages present a concise description of the Bonneville Power Administration's Fiber-optics Cable Plan, including all activities relating to installation, operation, marketing, and leasing of fibers/fiber-optic cables and related communication activities. Subjects of particular interest, as requested by Congress, are addressed in the sections noted below:

Activities relating to installation, operation, marketing, and leasing of fibers/fiber-optic cables and related communications operations:

Sections 1.3, 2.4, 3.6

Current and future operational needs:

Sections 1.2, 2.1, 2.2, 3.5

Current leases, planned leasing costs and revenues:

Table 1, Sections 1.4, 3.0, 3.6

Criteria used to determine where and when to **install fiber-optic cable:**

Sections 2.2.2, 2.3

Criteria used to **determine leasing agreements:**

Sections 3.1 - 3.4, 3.6.2

Summary tables (with cost-per-mile figures, outyear projections, expected revenues):

Tables 1 - 5

Justification of all fiber-optic cable installation activities, including the PMA's specific statutory authority for the activities included in the plan:

Sections 2.5, 3.5, 3.1 - 3.4

Policy and practice regarding the appropriate scope of PMA investments in fiber-optics, including preserving the role of the private sector in building fiber-optic networks:

Section 3.1

Public Benefits fiber:

Sections 1.1.2, 1.2, 3.5.2

Map of Bonneville fiber-optic and transmission routes:

Appendix D

For additional detailed Congressional questions and responses regarding Bonneville's fiber-optics program, please see Appendix A.

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BONNEVILLE POWER ADMINISTRATION
FIBER-OPTIC CABLE PLAN

1. INTRODUCTION

1.1 BONNEVILLE FIBER-OPTICS PROGRAM OBJECTIVES

1.1.1 Requirements

- **Enhance the safety, reliability, and adequacy of the power system.** Bonneville Power Administration (Bonneville) needs to ensure the reliability of its transmission system with a high-speed, flexible, reliable system of communications composed of fiber-optic cable, supplemented in some areas by digital radio. Fiber-optic installation increases Bonneville communication capacity and brings the agency up to date with contemporary technology.
- **Provide for our current and future communications needs.** Bonneville installs fiber-optic cable where there is a demonstrated operational need. Because Bonneville anticipates exponential increases in operational data traffic in the future, it is cost-effective to install cables with (currently) extra capacity.

1.1.2 Opportunities

- **Minimize Impacts on Transmission Rates and Bonneville's Borrowing Authority.** Encourage third-party or joint ownership through limited competition. Where Bonneville owns the fiber, seek third-party financing of cable investments, or, if Bonneville finances the investment, develop contractual arrangements for lease of dark, temporarily excess fiber. In all cases, the objective is to help Bonneville meet its financial and operational responsibilities, while minimizing the upgrade and operational costs and financial risks. When possible, develop contracts to lease temporarily excess dark fiber with a telecommunications service provider (TSP) to achieve a 5-year payback. Deploy any post-payback revenues to moderate future transmission rates.
- **Provide public benefits through the fiber-optic program.** Reserve, from temporarily excess dark fiber, at least four fibers for rural communities, public entities, other federal agencies, and customers.
- **Allow for infrastructure to support a Northwest Regional Transmission Organization (RTO).**

1.2 REVISED FIBER-OPTICS PLAN

- Bonneville will invest in fiber to meet **operational need.** To meet that need, both short- and long-term, the agency estimates it will require backbone routes at 72 fibers. We will retain 16 of those fibers to meet needs over the next 10 years (12 fibers for Bonneville, 4 for Regional Transmission Organization). The need is anticipated to reach 64 fibers by 2018, 76 by 2025. The agency will light Bonneville operational fiber within one year of completed build.

- Bonneville will encourage **third-party or joint ownership** through limited competition for new fiber-optic projects, where such ownership meets Bonneville pole attachment criteria (currently under revision) and is the least-cost alternative. In other cases, seek third-party financing or Bonneville will finance the needed fiber-optic cable. In order to ensure the security, reliability, and adequacy of the Bonneville transmission system, Bonneville will maintain all fibers.
- Bonneville will **lease dark fibers temporarily in excess** of its operational needs, reserving at least four of those fibers for public benefits. We will continue to market temporarily excess fiber via informal private offerings to TSPs. If resources and system conditions allow, Bonneville will take advantage of market opportunities to accelerate fiber build-out, using a 5-year planning horizon. We will reduce financial risk, and minimize perception of Bonneville intrusion into the marketplace, by working with TSPs to undertake projects through Projects Funded in Advance (PFIA) or lump-sum arrangements.

1.3 ACTIVITIES

- To date, about 1,975 miles of Bonneville fiber-optic cable have been installed on nine projects, at a cost of about $127M. Table 1 lists projects that have been completed as of December 1999.

Table 1: Completed Installations (December 1999)

COMPLETED INSTALLATIONS (DECEMBER 1999)				
PROJECT (substation - substation)	**MILES**	**FIBERS**	**TOTAL COST (M) (loaded)**	**JOINT PROJECT***
Hot Springs-Garrison (western Montana)	120	36	$10.4	**No**
Ross-Franklin-Bell (Vancouver, WA to Spokane)	558	36	$33.9	**Yes**
Bandon-Alvey (southwest Oregon)	123	36	$ 4.5	**Yes**
Keeler-Covington (Portland to Seattle)	197	72	$14.6	**Yes**
Alvey-Keeler (Eugene to Portland)	146	72	$ 8.7	**Yes**
Ross-Malin (Vancouver, WA to the California-Oregon border)	403	72	$23.5	**Yes**
Bell-Covington (Spokane to Seattle)	274	72	$16.9	**Yes**
Lane-Fairview (Eugene to Coos Bay)	108	144**	$11.4	**Yes**
Olympia - Aberdeen	46	72	$3.4	**Yes**
TOTAL	**1975**	**--**	**$127*** **	**Yes**

* A joint project indicates that TSPs or local utilities participated in funding the fiber-optic project and/or in providing revenues through leasing.

** One project has been built as 144-fiber cable: the TSP asked for this count and offered to pay for it. Because the higher-count build offered advantages to our ratepayers, Bonneville agreed.

*** Typical costs per mile are discussed in Section 1.4, following.

- Bonneville administers all fiber-optic installation, and uses either its own construction crew (as available) or expert contract crews to install, depending on outage availability. If no outage is available, and the line must be worked "hot," Bonneville crews will always do the construction. Overall, about two-thirds of Bonneville's fiber-optic capacity is installed by contract crews.
- Bonneville will always maintain the fiber-optic cables in order to ensure high availability.

1.4 FIBER-OPTICS COSTS

The typical cost of a Bonneville fiber-optic cable build (over the entire system) has been estimated at $50,000 per mile of cable. This includes the loaded installed cost of all cable installations and includes materials, design, installation, and all other overhead costs. If these costs were expressed as direct (unloaded) figures, the per-mile figure would be $38,400.

Cost per *fiber*-mile decreases as the size of the cable increases: a 36-fiber cable costs $1100 per fiber mile; a 72-fiber cable costs $800 per fiber mile. (For more questions and answers on this subject, please see **Appendix A**.)

To date, $42.7M has been received from fiber-optics leasing (one-time up-front fee and annual fees to date).

1.5 PUBLIC ACTIVITIES

- Bonneville has initiated a public interconnection/benefits program that reserves at least four fibers from its temporarily excess dark fiber for rural and underserved communities:
  - Bonneville has put in place an agreement with Northwest Open Access Network that allows for public benefit use for rural communities to interconnect with 1000 miles of Bonneville's fiber in the State of Washington. The number of fibers may increase as additional routes are built and additional local communities become involved with this effort.
  - Bonneville is working with CoastNet to provide some fibers for interconnection of rural communities in Oregon. Oregon may choose to work with Northwest Open Access Network, as well as with Idaho and Montana communities
- Bonneville has taken its Fiber-optics Program and Plans out for public comment. **Appendix B** presents a summary of those comments: in general, rural and underserved communities and consumer-owned utilities approved of the Bonneville approach that builds in opportunities for "public benefit" fiber, while Investor Owned Utilities held that Bonneville's overall approach represented an intrusion into the private marketplace.

2.0 BONNEVILLE'S INTERNAL NEEDS

2.1 TECHNICAL AND OPERATIONAL

Fiber and Reliability. Bonneville requires each of its communication systems to have a reliability of 99.986% to meet Western Systems Coordinating Council requirements (a subset of requirements established by the North American Electric Reliability Council). Bonneville is moving from an analog microwave radio system to a digital system because spare parts and systems are no longer being made. The agency's digital options were fiber-optic cable, digital microwave radio, and satellite. Satellite was rejected due to long time delays, low bandwidth, and high cost. Therefore, Bonneville is installing a primarily fiber-optic system, supplemented by a digital microwave system. Reliability will remain Bonneville's paramount reason for ensuring high-quality communications.

Under the Transmission System Act, the Bonneville Administrator is required to operate and maintain the system; construct improvements, additions, and replacements; and maintain the stability, reliability, and adequacy of the federal transmission system. As a matter of policy, to ensure the stability, reliability, and adequacy of that, the Administrator, in most instances, actually operates and maintains the system. In any case, the Administrator retains ultimate management and control over the system—must have the power to make the decisions and take the steps necessary for continued operations and maintenance. The North American Electric Reliability Council and the Federal Energy Regulatory Commission recommend that critical telecommunications facilities be the responsibility of the electric utility and that they be under their complete control. [1]

Cable Installation. Bonneville installs mostly All Dielectric Self-Supporting (ADSS) cables because they offer the best balance among reliability, cost, and ease of maintenance (alternatives are optical groundwire and helical wrap fiber cable). ADSS cables are purchased in a variety of fiber counts, strengths, and glass types as needed to meet the unique needs of each project. To date, Bonneville has installed standard-sized cables containing 36, 72, or 144[2] strands of glass for projects that run from 72 to 145 kilometers (45 to 90 miles) in length, depending on the type of terminal equipment used. The range of sizes (fiber count) that Bonneville uses is based on projected future needs for our backbone operational needs: these needs have changed over time. The cable size(s) (fiber count) is quickly evolving for the telecommunications industry, and associated technology, and has reached counts of 432 fibers for an ADSS cable.

- Deregulation requires more capacity to handle a growing number of transactions. System operations require intensive real-time monitoring and controls, high-speed digital control and protection systems, data operation, database matching between control centers, and wide-area measurement systems to monitor power system equipment performance, and help to assure continued system reliability.

[1] Federal Power Commission (now Federal Energy Regulatory Commission) Advisory Committee Report on Reliability of Electric Bulk Power Supply, June 1967, Volume II, page 23; NERC Operating Manual, Policy 7, 1996, page 1-2. Also supported by findings of the National Security Telecommunications Advisory Committee, NSTAC, Telecommunications Systems Survivability Task Force Final Report, February 1990.

[2] One project has been installed at the 144-fiber level; as noted earlier, the TSP offered to pay for the build, an opportunity to save ratepayers money.

- The cost of fiber-optics is less expensive on a life-cycle and per-channel basis than analog or digital microwave radio.
- Fiber-optics has a much greater capacity: Microwave Digital radios are limited to an OC3 system and have a capacity of 2016 voice circuits; fiber-optic and related terminal equipment will be operated at an OC12 and has a capacity of 8064 such circuits. Fiber-optic system capacity can easily be expanded by a factor of 100 or more to meet future need. Digital radios can be expanded only with additional frequencies. Fiber-optic cable is not terrain- and weather-dependent as microwave radios are. The cable is projected to last for 40 years. The radios have a 15-year life expectancy.
- Fiber-optics allows the agency to reduce its dependence on Federal radio frequencies. Frequency diversity, which is the mainstay of Bonneville's analog system, is no longer acceptable for radio systems; acquiring new frequencies near metro areas and along the Canadian border is very difficult. Bonneville's options are becoming limited because the Federal Communications Commission (FCC), on behalf of the Federal Treasury, is continuing to auction off government frequencies.
- In locations where Bonneville has passive reflectors and long paths, digital radios cannot be used as a replacement.
- A state-of-the-art communications system increases the value of the region's investment in the existing transmission grid and allows Bonneville to meet future new capacity needs without the environmental impacts of construction (the towers on which the fiber is strung are already in place).

2.2 CURRENT AND FUTURE OPERATIONAL NEEDS

2.2.1 Estimating Future Need

After estimating numbers of fibers needed for reliable operation, Bonneville began installing 36-fiber cables (an industry standard)[3] in 1996. Based on the growth in bandwidth requirements of new operational technology, Bonneville expects that the fiber count required to meet operational needs will reach at least 76 fibers by 2025 (see following discussion). Therefore, Bonneville is currently installing 72-fiber cable to meet estimated needs (see Table 2, page 7), depending on area of estimated demand.

Installing a larger (e.g., 72-fiber) cable than is currently required is highly cost-effective in planning for rapidly expanding future agency needs. Current thinking is to install more glass (fiber) at one time, rather than installing additional cables at a later time and dramatically increasing costs. The incremental cost for materials associated with a larger cable is nominal compared to the additional construction costs of repeated installations. However, as noted above, currently Bonneville intends to use 72-fiber cable unless circumstances warrant otherwise. Bonneville will provide for flexibility in the fiber program by assessing its fiber needs and investment in light of new and improving technology.

2.2.2 Determining Fiber-optics Requirements

Bonneville must plan both for its near-term and long-term operational needs for fiber-optic cable. The basic discussion below is supported by material in **Appendix C**: "snapshots" of

[3] Bonneville's experience indicates that typical industry sizes for cables used for long-haul routes are 36-, 72-, and 144-fiber cables.

Bonneville transmission system status and demands at 2008, 2018, and 2025, with corresponding projections of fiber counts needed to support the developing power system. We anticipate operational need for 16 fibers by 2008 (12 for Bonneville need; 4 for RTO); for 64 fibers by 2018; and for 76 fibers by 2025.

This projected need is based on a cable life expectancy of approximately 40 years, anticipated expanding future bandwidth demand, and maximum system reliability achieved through redundant glass paths. The fiber number varies depending on high demand areas (such as the North-South Intertie) and lower demand areas in Bonneville's more remote locations. Future bandwidth demand will be increased by the need for real-time operational data, RTO traffic, and administrative communications.

In considering reliability, it is important to distinguish between the goals of a telecommunications service provider and that of an electric utility: the TSP seeks to load each fiber with as much data as it can carry (maximizing carrying capacity); the utility seeks to ensure that the power system is secure and controlled: that the lights will stay on. Thus, redundant and independent glass strands are provided in order to accommodate the following major concerns:

- Direct control paths for transfer trip switching.
- Dedicated systems on dedicated fiber for different critical functions.
- Need for more fibers to provide complete redundancy of the fiber use, as more fiber is installed and size of rings is reduced.
- Spare fiber to be used in case of partial cable damage.
- Extra fiber that serves as a back-up path for short-term fiber damage in adjacent communication rings.
- Redundant fiber serving as back-up for long-term, catastrophic, adjacent ring damage.

Ring Reliability: Bonneville currently is installing major rings to provide the backbone communications for the transmission system. These backbone rings are 400 to 800 miles long. The larger the ring, the greater the chance of a failure. To increase reliability, Bonneville will continue to subdivide the large loops into smaller (about 150-mile) routes to provide alternate paths for communications traffic in case a cable is damaged and traffic has to be rerouted in the other direction. This doubles the need for fiber in the backbone rings.

Spare Glass: Fiber-optic cable can experience some glass breakage over time. Rather than replace the cable each time some aging glass breaks, Bonneville has included extra fibers in the cable for backup. The agency has to date only about 5 years experience with fiber, so Bonneville wants to be conservative to ensure that the fiber can be used for 40 to 50 years. In addition, extra fibers are added to take catastrophic events into account. If there is a mudslide in the Columbia River Gorge or a flood in the Willamette Valley, the whole loop can be alternately routed.

2.3 CRITERIA FOR INSTALLATION

Determining where and when to install fiber-optic cable is a multi-step process.

1. Determine operational requirements and priorities. Bonneville's first and foremost criterion for decisions on installing fiber-optic cable for communication is operational need. Operational requirements and priorities are typically defined by the following three factors:
   - What kind of control, protection and data acquisition information is needed to/from Bonneville facilities.
   - What level of availability for the communication system is required (main grid or sub-grid).
   - If main grid, what other reliability considerations are required (e.g., alternate routing, parallel fibers).
2. Identify resource requirements and impacts (capital and staffing needs; workload impacts).
3. Identify current commercial ownership or lease opportunities.
4. Where possible, select routes where operational requirements and commercial lease opportunities intersect.
5. However, select and construct projects that carry a "needed now" high operational priority, regardless of the presence of ownership or lease opportunities.
6. Consider routes where operational requirements exist and public benefits are possible, even though lease opportunities are not strong.

2.4 ACTIVITIES

The following projects have operational need priority and are proposed to begin in FY 00. However, not all expenditures for these projects will be captured within the FY00 budget.

Table 2: Projects Proposed for 2000

Project	Fiber #	Miles	Cost ($M)
Seattle - B.C. Border	72	166	$ 8
Spokane - Noxon	72	96	$ 4
Beaverton - Tillamook	72	100	$ 4.0
Umatilla - LaGrande	72	86	$ 5.3
Oregon City - Troutdale	72	66	$ 4.5
Port Angeles - Olympia	72	107	$ 6.5
Totals	----	**621**	**$32.3**

Table 3: Future Projects (FY01 - 05)

Project	Miles
Noxon - Kalispell - Hot Springs	165
Covington - Blaine #2	92
Keeler - Maple Valley	223
Alvey - Keeler #2	120
Hot Springs - Thompson Falls	25
Alvey - Malin	225
Thompson Falls - Taft	10
Bell - Boundary	100
Monroe - Chief Joseph (N Route)	120
Bandon - Gold Beach	50
Garrison - Anaconda	45
Franklin - Hatwai	130
Noxon - Hatwai	175
Taft - Bell	96
Swan Valley - Goshen	50
Aberdeen - Allston	135
Total	1,761

Bonneville will proceed with construction on any project that becomes identified as a high operational priority. Otherwise, where operational requirements identified in the previous table intersect with commercial opportunities, those projects will be fit into the annual budget constraints shown on the following table.

Table 4: Planned Capital Expenditures for Fiber-optics (FY01 - FY05)

Fiber Budget	Loaded Costs (30%) ($ Millions)
FY 01	$ 25
FY 02	$ 21
FY 03	$ 17
FY 04	$ 13

Fiber Budget	Loaded Costs (30%) ($ Millions)
FY 05	$ 9
Totals	**$ 85**

2.5 JUSTIFICATION OF ALL FIBER-OPTIC CABLE INSTALLATION ACTIVITIES: GENERAL AUTHORITY

Bonneville is statutorily mandated under the Transmission Systems Act (16 U.S.C. § 838, et seq.) to operate and maintain the Federal transmission system in the Pacific Northwest.

Also, under the Bonneville Project Act of 1937, Bonneville is mandated to maintain the Federal transmission system in order to continuously provide a reliable source of electric power to its customers. Section 2(c) of that Act states the following:

> *The administrator is authorized . . . to acquire . . . real and personal property . . . including . . . electric transmission lines, substations, and facilities and structures appurtenant thereto, as the administrator finds necessary or appropriate to carry out the purposes of this chapter.*
>
> Bonneville Project Act, § 2(c) 16 U.S.C. §832.

Consistent with the mandate to provide a reliable source of electric power to its customers, Bonneville acquires communications facilities necessary to operate its transmission facilities reliably. For reliability, security, and adequacy reasons, Bonneville has decided to install and maintain those facilities. This action is consistent with electric utility practice. Bonneville has maintained its own communications facilities under its existing authority.

Bonneville determined that it had the authority, under sections 2(e) and 2(f) of the Bonneville Project Act, to contract to lease fiber-optic cable capacity in excess of its current operational needs. Section 2(e) of the Bonneville Project Act explicitly gives the Administrator the authority to:

> *sell, lease, or otherwise dispose of such personal property as in his judgment is not required for the purposes of this chapter and such real property and interests in land acquired in connection with construction or operation of electric transmission lines or substations as in his judgment are not required for the purposes of this chapter . . . .*
>
> Bonneville Project Act, § 2(e) 16 U.S.C. §832

3.0 BONNEVILLE'S COMMERCIAL OWNERSHIP AND LEASE PLAN

3.1 FEDERAL POLICY

Bonneville installs fiber-optics cable first and foremost to meet its communications needs for a reliable system in an era of increasing data and response demands under deregulation. The Agency seeks to reduce costs to ratepayers by encouraging TSPs to own the fiber or to lease (temporarily) excess dark fibers that Bonneville does not presently use. Bonneville has

no interest in becoming a "common carrier" (see below) or in competing with the private sector. The Agency has taken great care to ensure that its actions are not consistent with those of a "common carrier" under Federal regulations, as noted below.

- **Federal Communications Commission Regulation**

  Bonneville is not a “common carrier” regulated by the Federal Communications Commission (FCC). Title II of the Federal Communications Act of 1934 is the law under which the FCC regulates "common carriers," TSPs that offer telecommunitions services on a universal, nondiscriminatory basis. Bonneville does not fit, and does not wish to fit this category. Bonneville only leases its temporarily excess fiber-optic cable capacity, and then only to selected TSPs that then transmit their own data as part of their business. Consequently, Bonneville is not competing with private sector providers of telecommunications services.

  Because Bonneville does not fall within the “common carrier” category, Bonneville is a “private carrier” in terms of FCC jurisdiction. The FCC generally does not regulate “private carriers.”

- **Telecommunications Act of 1996**

  The Telecommunications Act of 1996 allowed electric utilities to enter the telecommunications business, and encouraged federal agencies to make their facilities available for wireless PCS. The Act did not address the issue of the participation of Federal power marketing administrations (such as Bonneville). Consequently, Bonneville is not venturing into the telecommunications business by offering telecommunications services as Tacoma City Light, PGE-Enron, Montana Power, and other utilities are currently doing. **Bonneville has restricted its participation in the telecommunications industry solely to the lease of its temporarily excess unlit fiber-optic cable capacity.**

  Consistent with Bonneville’s limited participation, Bonneville is not pursuing the provision of lit services because of limitations on the agency's authorities and its lack of resources to provide such services. Bonneville may respond to requests from other Federal agencies for lit fiber for Federal operational needs.

3.2 LAND RIGHTS ANALYSIS

It is important to consider the sufficiency of Bonneville's land rights for installing fiber-optic cables. The agency's transmission lines occupy easements that have been acquired over the last 60 years for the purpose of electric power transmission and all related purposes. The easement language can vary significantly from project to project. Most easements provide Bonneville with the right to use the land for "electric power transmission purposes," and they contain specific language for appurtenances, including appurtenant telegraph/telephone and signal lines.

Attachment of fiber-optic cable systems installed for the operation and maintenance of the power system (either by Bonneville or by other utilities) is consistent with our land rights. Although Bonneville’s easement rights are generally sufficient to support Bonneville's operational needs, these easement rights may be insufficient to support use of third party-owned fiber, where such use would not be in support of the power system.

3.3 OWNERSHIP AND LEASING PLAN

Bonneville's Commercial Ownership and Leasing Plan is based on its commitment to upgrade its own communications system, thereby increasing reliability, safety, and adequacy, while minimizing costs to ratepayers. Therefore, it encourages third-party or joint ownership, third-party financing, or, if Bonneville finances the cable, Bonneville seeks to lease temporarily only those fibers presently excess to Bonneville need, with an eye to recovering the cost of original installation within five (5) years.[4] Bonneville thus receives the value of the physical asset, as its operational fiber is paid for by arrangements made for fibers currently in excess of agency need. After payback has been accomplished, any additional revenues are used to moderate rate increases.

The Plan's success is based on seven core ideas:

1. **Competition.** Promote competition by encouraging multiple TSPs.
2. **Opportunity.** Bonneville can provide a willing alternative source of dark fiber-optic capacity for TSPs.
3. **Infrastructure.** Bonneville can provide a path *via an infrastructure already in place,* not only for traffic within the region, but through it.
4. **Reliability.** Bonneville offers experience, core competencies, transferability of skills, and a level of reliability of service that can make it an attractive source of dark fiber in the Pacific Northwest.
5. **Public Service.** Bonneville can take advantage of high-revenue city-pair markets, while providing public service to rural or less-advantaged communities near its routes.
6. **Regional and National Value.** Fiber-optics provides an improved communication system to support the reliability, safety, and adequacy of the transmission network; improves customer satisfaction; increases the value of the business; and supports the financial viability of the TBL.
7. **Retrieval:** Bonneville will structure its agreements with third-party owners and its dark-fiber lessees so that sufficient fibers are available to Bonneville for use as the agency's operational needs grow.

3.4 THIRD-PARTY OWNERSHIP

Bonneville has traditionally held that only through Bonneville ownership of the cable itself could the needed level of reliability properly be served and the required schedule for upgrade of communications be met. However, in response to expressed interest by third parties in the PNW, that position is being modified. We will encourage third-party proposals, will conduct limited[5] competition, and will evaluate proposals from third parties who have

[4] An exception is made for "public benefit" fibers, where a longer payback timeframe is assumed in order to facilitate the closing of the "digital divide."

[5] Bonneville has its own procurement authority implemented through the Bonneville Purchasing Instructions (BPI). Under the BPI, the contracting officer has the authority to limit the competition to specific sources or offerors. See BPI, p. 6-A-27. Similarly, Bonneville will limit any fiber acquisition competition to only those offerors that are compatible with its system needs and use its discretion to choose the offeror(s) that it believes will meet that objective. Because Bonneville is not, and has no desire to be, a common carrier, Bonneville will not provide fiber to any and all parties that make an offer. Bonneville does not offer universal access to its fiber since such service is not consistent with Bonneville's operational needs.

expressed an interest in *owning* the cable installed on Bonneville structures, while providing Bonneville with the fibers needed for its operational and reliability purposes. Based on the results of these limited competitions, Bonneville will make its decision on whether it should lease fiber owned by a third party, or should own the fiber, based on the alternative with the lowest cost to Bonneville.

In making its decision on third-party ownership, one of Bonneville's goals will be to promote competition by encouraging multiple TSPs. To ensure that Bonneville's public benefits goals are achieved, as a condition for the use of federal rights-of-way and facilities, participants will make available, either directly or through Bonneville, at least four fibers, temporarily in excess to Bonneville's needs, for public benefit purposes (see section 3.5.2).

In consideration of potential third-party ownership, Bonneville is revising its fiber-optic pole attachment policy and developing criteria to ensure that the Bonneville reliability, safety, and maintenance needs and standards would be met for communications, infrastructure, and future transmission needs, to name a few (see section 3.5.2). These criteria will include advising the third party that it may be required to obtain and pay for easements along the route where Bonneville does not own the underlying land in fee; to negotiate and pay for permits to cross lands, including Bureau of Land Management, Forest Service, and tribal lands; and to understand their responsibility for all taxes. The third party would also be required to obtain a Bonneville permit for crossing Bonneville fee-owned land.

Bonneville's past practice has been to use bilateral discussions to develop commercial arrangements for fiber-optic cable. Bonneville wishes to have additional input from interested parties on how Bonneville should structure implementation of the third-party ownership option for future fiber-optic cable. Bonneville will solicit additional written comments and will hold a public meeting on this issue. At the conclusion, Bonneville may, as appropriate, revise its third-party ownership option. Construction of fiber-optic cable required by Bonneville will not be impeded or impaired by this process.

3.5 FIBER-OPTIC LEASING STRATEGY

3.5.1 Alternative Funding Strategy Comparison

Bonneville's Fiber-optic Strategy includes the temporary leasing of dark fibers surplus to Bonneville's current needs to TSPs, under a variety of contractual payback plans. The discussion below compares the provisions and impacts of a strategy that would *not* recover costs through leasing (A) with those of the strategy the agency is currently using, which includes cost-recovery through leasing (B).

- **Alternative A: Funded solely by Bonneville (ratepayers).** If Bonneville were to upgrade its communication system solely to meet current and projected operational needs, it would invest in a combination of fiber-optics and radio. To date, costs to install a minimal-sized 36-fiber cable for operational purposes only would have been $80M to $100M for the 1,975 miles already built. This entire amount would then be collected from transmission ratepayers, with the following financial implications:

    1. The capital investments would all be funded using Borrowing Authority.
    2. Payback would be 40 years, the average depreciation life used by Bonneville for installed fiber.
    3. By definition, the net present value (NPV) of the investments would be zero, because rates are set to exactly recover costs, including a charge for risk.

4. Transmission ratepayers would pay for the entire cost of upgrading the communication system, because there would be no TSP revenues offsetting the costs of the fiber-optic investments.

✍✍ **Alternative B: Funded by Bonneville (ratepayers) and TSPs.** Bonneville has built to meet high future Bonneville fiber-optic needs (now standardizing on 72-fiber cable; leasing the temporary excess fibers). This means that installations to date have cost $127M (rather than the $80 - $100M noted above). The extra $27 - $47M can provide the following financial benefits:

1. The TSPs provide part of the capital needed to upgrade Bonneville's communication system. This could increase the amount of Borrowing Authority available for Bonneville's other capital needs.
2. The goal for all projects that involve TSPs is to reduce payback time from 40 years to 5 years.
3. The NPV is greater than zero for all deals involving TSPs.
4. The transmission rate effect of upgrading communications capability is minimized, because TSP revenues lower the transmission revenue requirement. The 1996 Rate Case anticipated TSP revenues for telecommunication services averaging $9 million per year, which offset transmission rates.

In addition, the transmission system infrastructure becomes more valuable. The revenues and up-front capital received from the TSPs will make it economically feasible for Bonneville to provide fiber-optics over a much greater portion of the transmission system, perhaps at a faster rate.

3.5.2 Bonneville Policy

✍✍ **Fiber-optic Pole Attachment Policy.** Bonneville's fiber-optics pole attachment policy is currently under review; changes are being made to allow for potential third-party ownership of fiber-optic cable on Bonneville structures (see Section 3.3.3). Those proposed revisions will be published for public comment before they are made final. Although changes are being proposed, Bonneville must continue to ensure that the transmission system continues to be reliable and safe, and that it operates within our existing standards. Certain criteria will be identified as part of revising the pole attachment policy that will take these concerns into consideration.

Key conditions for Bonneville's existing pole attachment policy are as follows:

?? Bonneville owns all fiber-optic cable installed on or entering Bonneville facilities.

?? Only Bonneville crews or Bonneville-approved contractors may install fiber on Bonneville facilities.

?? In all cases, Bonneville shall have exclusive rights to the number of fibers necessary to meet its operational needs, including fibers for redundancy and any other technical requirements.

?? Bonneville operational needs take precedence over needs of third parties. Lease arrangements are limited by Bonneville's operating needs.

Current and proposed changes to Bonneville's policy for pole attachment or interconnection with TSPs and other electric utilities are summarized by the following points:

- **Use**: All uses of Bonneville's real property must be approved in advance.
- **Access Rights**: TSPs and electric utilities must secure their own rights of access to Bonneville's rights-of-way from the underlying landowners, as needed.
- **Connectivity Allowance**: Bonneville allows *Foreign-fiber*[6] connectivity into Bonneville substations for the exclusive purpose of an electric utility's operational power system needs relating to communication, control, protection, and data acquisition.
- **Fiber Limits:** The number of *Foreign-fibers* with connectivity into a Bonneville substation is limited to the number of fibers, including spares, that the electric utility needs for power system operational purposes.
- **Ownership:** A third party may own fiber-optic cable attached to Bonneville transmission structures or facilities, subject to meeting certain criteria. For instance, the third party may have to obtain easement rights from each landowners along the right-of-way. (The access rights noted above cover only entrance to the site—not the placement of fiber-optic cable on the structures. Easement rights must additionally be obtained.)
- **Foreign-owned Limits**: Bonneville does not allow foreign-owned commercial facilities, such as regeneration huts, or capabilities inside a Bonneville substation perimeter fence because of safety and reliability considerations.
- **Pole Attachments.** Attachment of foreign fiber to Bonneville-owned transmission structures has been allowed only in limited circumstances, due to paramount concern for maintaining reliability of the Pacific Northwest transmission system.

In addition to the requirements for obtaining easement rights (above), a third party must also meet standards of reliability to include those of the Western Systems Coordinating Council (WSCC), as well as standards for infrastructure and communications.

- **Public Benefit Fiber.** One important goal of Bonneville activities under the Commercial Plan is to expand access to advanced telecommunications services to underserved rural communities and to make this access to services more affordable. We seek to move towards this goal by reserving four dark fibers (from our currently excess fiber) for public benefits use. (Note that many telecommunications companies have focused on urban areas because the return on investment is higher in dense population areas and will support a legitimate business case; this often leaves rural areas lagging behind.) So long as this objective—to enable rural access rates comparable to urban rates—is furthered, Bonneville will entertain the possibility of contracts with both non-profit and for-profit entities that want to provide telecommunications services to rural areas. Bonneville can provide the following advantages to the rural communities as fiber-optic cable is installed on existing facilities that coincidentally reach many rural communities while, at the same

[6] "Foreign," as used here, means non-Bonneville fiber or equipment.

time, reaching Bonneville's facilities. This also allows the local communities to become involved and take the lead in this effort of interconnection with long-haul dark fiber.

- Bonneville's goal is to provide opportunity for interconnection to those rural communities that currently have limited or no present telecommunications capacity.
- If some limited capacity is present, Bonneville's aim is to help ensure that the cost for telecommunications services is comparable to that in an urban area.
- The availability of fiber-optic cable in a rural community could allow an organization to provide services to rural communities for hospitals, schools, libraries, and so on.
- Fiber could also bring economic development to rural communities and/or assist them in retaining existing businesses; the stipulation is that communications for these purposes must originate or terminate in the rural area.
- Bonneville or other fiber owners will provide at least four dark fibers for rural communities on all Bonneville fiber-optic cable routes (nine projects as of December 1999).
- Any entity leasing public benefit fibers from Bonneville is required to comply with state regulatory, registration, and certification requirements, whether or not that entity is defined as a TSP.

3.5.3 Criteria for Leasing Agreement Decisions

The following conditions determine where and when leasing agreements are made between Bonneville and parties interested in leasing excess Bonneville fibers:

- Bonneville's operations determine the amount of fiber that can be characterized as "excess" and the terms of its availability.
- A market analysis (carried out at six-month intervals) helps determine potential rate structure; rates vary, depending on route location, number of fibers, length of term, and numbers of fibers left on any given route.
- Analysts check the TSP's finances and carry out a risk assessment on the TSP's ability to pay and the likelihood of Bonneville recovering its costs.
- To minimize risk or loss of investment, Bonneville is continuing to diversify contract types (annual fee or one-time upfront) and customer base.
- The expected life of a fiber optic cable is about 40 years. Bonneville assesses its operational needs before determining length of term (between 5 and 25 years) to lease fiber on any given contract. Given these facts and Bonneville's planning process before leasing, the agency has not taken back any leased fiber ahead of schedule. Bonneville has anticipated flexibility in operational needs by varying the contract terms.

3.6 LEASING ACTIVITIES

3.6.1 Current and Planned Leasing Summary

The following table shows TSP actual and forecast revenues for FYs 1997 – 2002 for existing and near-term projects. Estimated revenues are in italics.

Table 5: Current and Projected Fiber-optics Revenues ($M)

1997	1998	1999	2000	2001	2002	2003	Total
$ millions							
1.4	2.1	3.7	*10.5*	*14*	*15*	*19.8*	*66.5*

* **Note:** FY97 through FY99 entries represent revenues from audited financial records. Entries for FYs 02 - 03 (in italics) are revenues used for the 2002 TBL Initial Rate Proposal.

✍✍ Bonneville has received assets (such as terminal equipment, additional new wood poles, construction of access roads, and clearing of the right-of-way) worth $17M through various agreements with TSPs over the last 5 years. Assets, and projects funded in advance or lump sum fees, are considered as revenues recognized over the life of the contract. Therefore, although about $42.7 million in assets, annual revenues, and lump-sums has been received to date, the assets and some of the cash receipts are recognized over the life of the contract and included in actual and projected revenues above.

3.6.2 Lease Rate Justification

Based on operating needs, Bonneville will lease temporarily excess fibers for periods of 5 - 25 years. Bonneville is structuring the leasing of its excess fiber capacity to TSPs to result in short (5-year) paybacks of the capital investments. Bonneville uses a single contract format (terms and conditions). However, the agency does not use a single pricing strategy because it believes that using varying pricing strategies can maximize payback.

Several different types of commercial lease arrangements may be negotiated. Each route has a different market rate associated with it. The differences are based on the following:

- ?? city-pair,
- ?? distance between city-pair,
- ?? numbers of fibers leased,
- ?? availability of fibers,
- ?? term of contract,
- ?? primary route vs. backup or redundant route,
- ?? market/route demand,
- ?? presence or lack of available infrastructure,
- ?? capital payback, and
- ?? Bonneville's operational need for the route.

Based on the demand for a particular route, pricing will vary for each route and the value of a route will change over time. Much of the potential risk associated with cost recovery can be mitigated through contractual conditions (see 3.3.2). However, it is important to remember that, as investment risk shifts to the TSP, so does revenue potential. Below are the types of commercial arrangements Bonneville currently uses for its fiber-optics leasing plan.

1) **Projects Funded in Advance.** The TSP finances part or all of the costs for materials and installation one-time up-front, in exchange for temporary use of some of the fibers. Bonneville owns all the fiber-optic cable and retains a certain number of fibers for operational use. The number Bonneville will need for operational purposes will increase over time.

2) **Fixed fee.** Bonneville finances the materials and installation of the fiber-optic route. The TSP pays an annual fixed fee for some of the fibers.

3) **Equipment/services Agreement.**[7] Bonneville or the customer may finance construction, depending on the amount of money Bonneville wants to invest in this option—the more equipment or services, the more Bonneville would receive from the customer. This type of arrangement may involve the exchange of equipment or services in lieu of cash payment.

4) **Hybrid.** Combinations of 1-3, above. The arrangements discussed in 1 - 3 may be combined in an agreement.

Any of these agreements may be tailored to needs in length of time, maintenance costs, and restoration. In all cases where Bonneville funds the fiber-optic installation, Bonneville will own and maintain the entire cable, but will install terminal equipment only for its own operational uses. Commercial lessees will lease temporarily excess dark fiber from Bonneville and will be responsible for providing the electronic terminal equipment that they will need to use.

3.7 FINANCING FIBER-OPTIC INVESTMENTS NOT OWNED BY A THIRD PARTY

Bonneville has two options for financing fiber-optic investments not owned by a third party: 1) Federal borrowing authority or 2) cash provided by TSPs. Bonneville uses borrowing authority to finance these projects under the following conditions:

1. when the fiber must be installed in order to meet transmission system requirements and no TSP is interested in leasing the fiber, or
2. when a commercial arrangement with a TSP provides for annual fixed fee or one-time up-front payment agreement.

When no TSP is interested in leasing the fiber (condition 1), the cost of the fiber investment must be recovered from transmission revenues. When the fiber route has an annual fixed-fee agreement or one-time up-front payment arrangement (condition 2), the cost of the fiber is recovered by a combination of TSP revenues and transmission revenues. Bonneville does not issue a specific debt instrument for fiber investments; rather, it issues debt period- ically for accumulated transmission capital spending without regard for specific projects.

When Bonneville uses cash provided by TSPs to finance the fiber-optic investment, Bonneville owns the fiber and retains the right to use the fiber for operational purposes. The TSP has a lease agreement with Bonneville to use some of the fibers for a specific term, as identified in the agreement.

[7] This kind of agreement could stand alone, or could apply to either of the previous options.

APPENDIX A: Congressional Questions and Responses

1. What percentage of Bonneville's fiber-optic capacity is it actually using now for its own purposes?

Response: Nearly all (or about 98%) of the cable routes installed to date will carry Bonneville traffic by the end of calendar year 2000. Bonneville proposes to have lit 2 to 4 fibers on our current system by the end of calendar year 2000; within 10 years, the agency expects to have lit 12 - 16 fibers lit for operational purposes on these routes. This is nearly 30% of the total numbers of fiber installed today.

2. Compared with other power marketing administrations, why is Bonneville spending so much on its fiber-optic system? Bonneville estimated the cost of its fiber-optic system to be about $50,000 per mile of cable, whereas SWPA estimated its costs at $18665 per mile and WAPA estimated its costs at $8421 per mile.

Response: The typical cost of a Bonneville fiber build over our entire system has been estimated at $50,000 per mile of cable. Bonneville's estimate is the **loaded installed cost of all of our cable installations and includes materials, design, installation and all other overhead costs**. A typical estimate combines the use of different size cables such as a 36-fiber cable at $40,000 per cable mile or $1100 per fiber mile, some 72-fiber cable at $60,000 per cable mile or $800 per fiber mile.

The latest information available for the three PMAs indicates the following:

(1) **WAPA's** installed cost per mile is currently estimated at $10,349 per mile (loaded). WAPA has arranged for other entities to underwrite costs of its cable installation; these contributions are not included in their calculations as part of the "total cost" of cable installation.

(2) **SWPA's** latest installed cost-per-mile is estimated at $39,883 per mile (direct costs, not loaded). SWPA includes all costs (labor, travel, rent, contracts, supplies, and equipment) in their calculations.

(3) **Bonneville's** latest typical installed cost per mile, as noted above, is approximately $50,000 per mile (loaded). If these numbers were reported as direct costs (as SWPA's are), the figure would be $38,400 per mile. Bonneville reports all costs (as SWPA does), but includes the load (which SWPA does not).

3. Again compared with other power marketing administrations, why is Bonneville building such excess capacity? Bonneville said its fiber-optic cable ranges in size from 36 to 144 fibers, while SWPA said most of its "optical ground wire" contains 12 strands of fiber. While Bonneville's cable has "from 36 to 144" strands of fiber, the Bonneville Administrator told the Appropriations Subcommittee that Bonneville is retaining just 12 fibers for its "short term needs." She also reported that Bonneville has reserved only 20 percent of its total dark fiber optic capacity for the current in-house use of the Federal Columbia River Transmission System.

Response: Bonneville's installations are based on the life of the fiber cable, at least 40 years. Bonneville has determined that our future telecommunication needs on a system

wide/regional basis would best be met by fiber cables of 72 fibers. This number should meet our expanding communication capacity demands, achieve high safety and reliability of the transmission system, and offer critical future flexibility, expansion and reliability options. In the short term (next 10 years - approximately through 2008), Bonneville's best estimate is that it will need 12 fibers for operational purposes. In the longer term (next 20 years), Bonneville conservatively estimates a need for 64 fibers by 2018; and for 76 fibers for operational purposes by 2025. The numbers of fibers needed for operational purposes is expected to increase beyond this number on certain routes.

Six years ago, Bonneville began installing 36-fiber cable to upgrade our aging analog microwave system. Since then, we have determined that this was short sighted and therefore have increased the fiber count to accommodate increasing future needs; we may have to go back to certain backbone routes and install additional fibers to increase to 72-fiber cable. In the meantime, we have standardized on 72-fiber build except for one line, where a TSP asked for a 144-fiber cable build and offered to pay for it. The higher-count build offered advantages to our ratepayers (more fibers available without the upfront cost of construction), so we agreed. Although our standard is now 72-fiber cable installation, we remain open to the idea that there is the potential for our operational needs to increase beyond our recommended numbers, and that this number may change.

4. The Bonneville Administrator told the Appropriations Subcommittee, "Fiber optics are installed by the transmission arm of Bonneville to ensure the operations safety and reliability of the transmission system." How does that narrow purpose justify the magnitude of Bonneville's investment in fiber optic cable? If Bonneville's level of fiber optic cable investment is truly necessary to ensure "operational safety and reliability" of its transmission system then must not the safety and reliability of the other PMAs transmission systems be in grave danger.

Response: Bonneville must reliably operate and maintain the Federal Columbia River Transmission System (FCRTS), which provides about 75 percent of the Pacific Northwest's high-voltage electric energy transmission capacity. The FCRTS includes 15,000 circuit-miles of electric transmission lines and 324 electric substations spread out over 300,000 square miles. The transmission system links large generating resources of 29 dams on the Columbia River in remote regions to several large and growing urban population centers. More than one-third of the transmission system is contracted for moving power (wheeling) for parties other than the Federal government. The managers of the FCRTS work in cooperation with other regional and extra-regional utilities and others to ensure an effective, efficient and highly reliable power system for benefit of the region's population of more than 10 million persons.

Bonneville's justification to upgrade our existing transmission system's telecommunications needs, with this level of fiber-optic investment, is based on meeting our operational safety and reliability requirements. Bonneville—as well as other electric utilities—requires communications systems that they control to operate transmission grids. Bonneville uses redundancy to achieve high reliability and security, which requires more fibers. Bonneville has determined that to keep our system at a high level of reliability and security, we will dedicate layered systems, using separate fibers, for specific needs and uses of the communication system. Radio frequency availability is declining. Only fiber-optic technology offers the appropriate speed, reliability, capacity,

expandability, and affordability. Bonneville has determined that, for its system applications, using lower-count cables is uneconomical. Bonneville's telecommunication architecture requires a first wave of fiber-optic installation forming large backbone rings, to enhance both operational telecommunications and transmission grid reliability. These rings are being subdivided into smaller sub-rings doubling the demands on all cables. While Bonneville is not able to predict the exact amount of fiber required in the future, we do know that extra fibers will offer critical expansion and reliability options. Outages and shortages in the Northeast and Midwest during past years have shown that reliability in other parts of the country is at risk.

5. The information Bonneville provided the Appropriations Subcommittee quotes from an unidentified "report to the Congress on competition" that states "Bonneville wants to support the development of the information super highway." What statute gives Bonneville the mission, responsibility and authority to "support the development of the information super highway"? (We are <u>not</u> asking about Bonneville's authority to lease personal property.)

Response: The April 1999 Department of Energy Competition Report to the U.S. Congress, which was cleared by the Office of Management and Budget, was requested by H.R. Conference Report No. 105-749 (page 90) (1998). That Competition Report states that, "Bonneville is designing and installing this fiber-optic system on its transmission rights-of-way to meet its current and long-term operational needs. Bonneville utilizes its broad contracting and procurement authority to contract out substantial portions of its fiber optic construction. Bonneville's rights-of-way create the opportunity for fiber optic resources to be developed by private telecommunications firms in the region. In this respect, Bonneville wants to support the development of the information super highway by creating opportunities for the private sector to develop the commercial market. In leasing excess fiber-optic capacity, Bonneville is not competing with private telecommunications firms. Bonneville is not selling telecommunications services. Excess Bonneville dark fiber is being leased to private telecommunications firms until it is required for Bonneville operational needs. Dark fiber is non-working fiber-optic cable that has not been lighted by any user to provide telecommunications services." (page 22)

We believe that this report makes clear that Bonneville has not indicated that its mission or responsibility is to support the development of the information super highway. Bonneville can, however, provide an opportunity for rural communities to have access to fiber-optic technologies, because we have fiber-optic cable that is already in or being constructed in those areas to meet our current and future operational purposes and is temporarily in excess of current needs. We have the authority to lease our property. We believe this approach is very consistent with the President's goal, as he stated in his recent State of the Union Address, of having the Executive Branch of the Federal Government work diligently to help bridge the "digital divide." Bonneville is not providing any telecommunications services to these communities. In fact, Bonneville will only make available dark fiber *<u>which a private telecommunications company or other telecommunications provider</u>* must use to market telecommunications services such as Internet access, voice and data transmission, or other telecommunications needs. Therefore, if a telecommunications provider does not step-in to provide telecommunications services, no telecommunications services are provided. Bonneville is not in the business of providing those commercial services and has no plans to do so

in the future. However, where Bonneville has temporarily excess dark fiber that can be leased to a private telecommunications company for use in rural communities, Bonneville has the authority to provide that company with a lease.

6. At a Bonneville conference in Spokane, Washington, on fiber optics, one of the featured speeches will discuss "fiber optics as an economic development technique". Another speaker argues, "There is an opportunity here for Bonneville to spur the development of a new telecommunications-based economy." What is Bonneville's statutory authority to foster "economic development" by way of its provision of telecommunications facilities? Why should those in the Pacific Northwest get federal assistance in that regard or in gaining access to "the information super highway" if the same assistance isn't provided to all other regions, including those served by the other PMAs or by no PMA? Should the federal government via Bonneville, be competing against private-sector firms to develop a new telecommunications-based economy?

Response: To the extent that Bonneville "fosters economic development," it does so in the manner described in answer 5—creating an opportunity for private telecommunications companies or other telecommunications providers to lease Bonneville's temporarily excess dark fiber because that fiber is already in the area. Bonneville is not competing with private-sector firms, but creates an opportunity for them to have a larger customer base as a consequence of our need for operational fiber in those areas.

7. In several places the information provided the Appropriations Subcommittee states that Bonneville's excess fiber is available to others only until such time as it will be required to ensure the operational safety and reliability of Bonneville's transmission system. What will those who have relied upon the Bonneville fiber for telecommunications purposes do when Bonneville recalls the fiber for its own purposes?

Response: The numbers of fibers and term length of each lease are negotiated with each lessee and are included in the contract. The number of fibers and length of the leases are identified first for Bonneville's operational needs. The lessee knows from the beginning the length of their contract arrangement, and therefore has that length of time to make other arrangements and to plan for their future needs.

8. The Bonneville Administrator told the Appropriations Subcommittee, "Bonneville's excess fiber is marketed at a fair market value." Please list all those that are using Bonneville excess fiber, what they are paying and the duration of their rights to the fiber. For each, was the transaction the result of an advertised competitive bidding process wherein any entity wishing to bid could bid? If the bidding was open to only certain entities, identify those entities and explain why others were excluded. In each case where competitive bids were taken, how many bids were received? If competitive bids were not solicited, why not? How can Bonneville know it actually received "fair market value" in those cases where excess fiber was leased through a process other than advertised competitive bidding open to all entities wishing to bid?

Response: Bonneville is not a telecommunications company or a common carrier. Bonneville has taken every precaution to ensure that it is not leasing temporarily excess fiber in a manner that could characterize Bonneville as a common carrier. Bonneville has

no intention of competing with common carriers and can not provide telecommunications services as they do. Bonneville's fiber communications is for its current and future operational needs. Bonneville needs to have adequate controls on that system, and can not put itself in a position of providing fibers to multitudes of telecommunications providers. Bonneville has acquired knowledge of the fair market value in the Pacific Northwest through the analysis and research completed by outside consultants on a six-month basis. In order to get this information, these consultants contact utilities and telecommunications providers and get information on various routes in the region and their market value. The value of fiber continues to change and updates of the value continues to be an on-going effort.

Leases are negotiated between the Bonneville and the interested party or parties. They generally arise out of the opportunities that exist and evolve in the ever-changing marketplace. The criteria for lease arrangements are provided in the PMA Report to the Congress (attached); additional information is summarized in the answer to Question 11. (Any more detailed information is classified as Business Sensitive: we have been asked through non-disclosure agreements with the TSPs not to discuss certain information.)

9. The Bonneville Administrator told the Appropriations Subcommittee Bonneville "estimates that the market value of the dark fiber optic capacity installed to date, which is in excess of Bonneville's current operational need, is about $120 million." What percentage of Bonneville's fiber optic capacity does this refer to? Is the $120 million the estimated market value of that capacity over its life or over some shorter period? How did Bonneville arrive at this dollar estimate? How does the estimated market value compare with the cost of that capacity?

Response: This estimate is based on the approximate market value of 50% of the fiber installed to date. The estimated market value is based on a 20-year period, which is half the anticipated cable life. This dollar amount was estimated based on market research done on various routes within the Pacific Northwest. Bonneville requests a market analysis about every 6 months on existing routes as well as on those future routes that Bonneville needs to reach but that others may not be interested in. The cost and estimated market value are comparable; the approximate cost of the system today is $127 million and the estimated market value of this existing fiber is around $127 million.

10. Is it your view that the federal government should be encouraging greater reliance on government to provide telecommunications service? If consumers in sparsely populated areas or poor communities deserve a subsidy in order to have telecommunications service would it not make more sense to give the subsidy directly to those consumers so they could buy service from private providers? If the federal government is going to subsidize the provision of new telecommunications service for those who can't otherwise afford it, why should the federal government favor those served by government providers over those served by private providers?

Response: Bonneville is not in the business of providing telecommunications service. As mentioned above in answers 5 and 6, Bonneville only creates an opportunity for other firms to provide telecommunication services because Bonneville fiber is already in or being constructed in certain areas for its operational upgrade. Leases of public benefits fiber contain restrictions on and requirements for use not found in general commercial

leases of dark fiber. Those conditions insure the availability of the fiber for use by rural areas.

No aspect of Bonneville's fiber-optic capacity program involves a transfer of taxpayers' funds from the U.S. Treasury to rural communities. Pricing of public benefits is designed to fully recover Bonneville costs at market-based interest rates, with reasonable operating margins to cover risk, over a recovery period of 20 years, which is half of the estimated life of the fiber-optic cable asset. While it is true that the general telecommunications industry standard of cost recovery for commercial fiber is 1.5 to 3 years, the extended recovery period for public benefits fiber allows rural rates that begin at amounts such that these communities can afford to contract for services from the ultimate telecommunications service provider. Bonneville's pricing of dark fiber in rural areas may provide an earlier entry of these services to those areas. Bonneville does not restrict eligibility for participation in public benefits fiber by business type. The entity contracting with Bonneville may be public or private, profit or non-profit.

11. What is the fully allocated total annual cost (broken down by depreciation, O&M, marketing, contracts and legal overhead, etc) for Bonneville's fiber optic facilities? What is the annual revenue Bonneville receives from each of the following categories of users of Bonneville's excess fiber, private telecommunications firms, investor-owned utilities, other utilities and communities?

Response: The approximate fully allocated annual cost for FY00, based on the $127M spent to date to build fiber-optics projects, is as follows:

Cost Category	$Millions
Depreciation	$3.2
O&M	$2.0
Marketing, Contracts, Legal	$0.4
Overhead	$0.6
Interest	$7.2
Total	**$13.4**

Note: For accounting purposes, the fiber is depreciated at 40 years.

Revenues for FY00 by company type are as follows:

Company Type	$Million
Private Telecommunication Firms	$9.975
Investor Owned Utilities	$0
Other Utilities	$.009
Communities	$.516
Total	**$10.500**

12. How does Bonneville allocate the costs of its fiber-optic cable investment? Is it allocated to Bonneville's transmission revenue requirement or to its power revenue requirement? Why should either transmission or power customers pay for Bonneville's supporting "the development of the information super highway? How are revenues from Bonneville sales

of excess fiber allocated as between Bonneville's transmission and power revenue requirements?

Response: Bonneville installs fiber-optic cable as part of the communications equipment used to operate the Federal Columbia River Transmission System. As such, the cost of the fiber-optic investment is fully included in the transmission revenue requirement. However, revenues from leasing fiber-optic capacity that is in excess of Bonneville's current needs are used to offset the transmission revenue requirement. Transmission customers pay only for the fiber-optic costs associated with Bonneville's present and future use of the cable for operating the transmission system. Allocation of costs and revenues will be discussed in the Transmission Rate Case.

APPENDIX B: Public Comment on the Fiber-optics Program

- **PUDs and their Associations strongly supported the goals and scope of the Program.**
  - They deemed it prudent utility practice to estimate future need and build with a measure beyond that estimate, citing parallel savings and efficiency in power line construction.
  - They applauded Bonneville's commitment to public benefits fiber, underscoring county and rural needs in underserved areas and comparing the present situation to that in the 1930's, when private concerns were reluctant to invest money in bringing electricity to rural areas and Bonneville took up the task.
  - Thirteen PUDs commented on the Program [Franklin PUD, Wahkiakum County PUD, Douglas PUD, Western Montana Electric Generating and Transmission Cooperative, Clallam County PUD, Idaho Consumer-Owned Utilities Association, Northern Wasco County PUD, Benton PUD, Northwest Open Access Network, PUD No. 2 of Pacific County, PUD No. 1 of Okanogan County, Skamania County PUD No.1, PUD No. 1 of Whatcom County].
  - The Public Power Council also strongly supported the Program, especially for public benefit reasons: ". . . Bonneville is providing a critical public service in ensuring that rural and other underserved areas of the Northwest gain access to modern telecommunications technology, which is becoming increasingly important in being able to attract businesses and economic development."
- **Private interests, including IOUs and their Associations, strongly opposed the goals and scope of the Program.**
  - They held that Bonneville was exceeding its statutory authority (WAPA's fiber build is far lower), creating additional (rates and obsolescence) risk for its transmission customers, and unfairly competing with private concerns that could perfectly well undertake the tasks Bonneville was claiming as its own.
  - They felt that Bonneville had not released enough information to comment properly, and that more was needed.
  - They asserted that the "public benefits" service was an unsupported and "self-fulfilling" prophecy.
  - They asserted that others could do it better and cheaper. Bonneville should (1) sell current fiber assets to a private TSP that would then provide operational fibers for Bonneville need (some asserting that Bonneville could not possibly need more than 12 or, in one case, 2, fibers), or/and (2) allow a private concern to build Bonneville's future fiber system, using Bonneville right-of-way and facilities as supports for the fiber.
  - Fourteen private concerns commented on the Program [Flathead Electric Cooperative; PacifiCorp, Enron Power Marketing, Inc, and Idaho Power Company; Avista; Puget Sound Energy; Montana Telecommunications Association; Alcoa, Columbia Falls Aluminum Company, Kaiser Aluminum and Chemical Corp, and Vanalco; Portland General Electric; Montana Power Company].

SAMPLING/SUMMARY OF PUBLIC COMMENTS
ON BPS FIBER-OPTIC PROGRAM

PRO

- "Like any business, Bonneville should be able to use its assets to the greatest benefit to its owners the public." [Email from a private individual from Cheney, WA [rural])
- "[We] are involved in the evaluation and upgrade of [our] communication system for many of the same reasons Bonneville stated in its recent issue papers and public meetings. We believe that Bonneville's evaluation and upgrade process must not only provide an immediate remedy to today's electric utility communication needs, but also needs to provide capacity and scalable communications technology for the long-term benefit of our customers." [Franklin PUD, others]
- "It is prudent for Bonneville and electric utilities to select the most scalable and cost-effective medium for that [robust communication] system. . . . Even though a utility's current communications system requires a specific number of fibers, an efficient and far-sighted utility will install the quantity necessary for the greatest need it can foresee, plus an additional quantity for yet-unidentified future needs. This is common practice for the utility industry . . . . It is good business and a common practice to install the greatest capacity affordable." [Franklin PUD, others]
- Bonneville's objective to emphasize customer service and public benefits to rural communities is commendable and vital to enabling rural areas of the Northwest to survive the transition towards an information economy. . . . The [digital] divide is most apparent in the PNW, and is one of the reasons why the prosperity of the region's metropolitan and suburban areas is not being shared or experienced in rural communities. NW technology companies will not expand or relocate their businesses in rural areas without advanced communications systems. By dedicating the excess capacity of its communications system for public benefits, Bonneville will enable rural communities to participate in the information age and new economy." [Franklin PUD, others]
- ". . . the [TBL] should increase its capital investments for the installation of dark fiber to all areas of the Bonneville service area. Especially the rural communities of Washington and Oregon." [Wahk. PUD]
- ". . . the ICUA [Idaho Consumer-Owned Utilities Association] opposes limitations some propose to place on Bonneville that would unnecessarily prevent the needed mission from being achieved [especially public benefits]."
- Wahk. PUD: [which understands that fiber will be coming through there next year]. **"This installation is eagerly anticipated by the local School Districts as the District has indicated that we will run fiber to the schools free of charge. Also numerous other public entities, and various commercial businesses have contacted the District regarding the availability of wideband communication. As a rural county, with a very small population, private firms are just not interested in providing these types of communication links. No money in it for them."**
- "In addition to our internal operative needs, **Wasco County has lost employment opportunities for lack of adequate communications capability. This program**

has tremendous opportunity to communities such as The Dalles and Wasco County to greatly bolster their industrial development/expansion potential." [N. Wasco PUD]

- "The Public Power Council would like to support unreservedly the continuation of Bonneville's fiber optic program [both building to include currently excess fibers and public benefit]. . . . Bonneville is providing a critical public service in ensuring that rural and other underserved areas of the Northwest gain access to modern telecommunications technology, which is becoming increasingly important in being able to attract businesses and economic development."

CON

- " . . . Bonneville is spending a tremendous amount of money on a communications program that benefits few and may be a springboard for Bonneville to develop another business line at the expense of its transmission customers." [Flathead] [Avista]
- Bonneville should invest only for fiber "clearly necessary for the reliable and secure operation of its transmission system." [Avista]
- Bonneville clearly intends to compete; this is not appropriate for a federal agency. [PacifiCorp et al]. Competition has detrimental effect on other TSPs. [PacifiCorp et al]. Private investment will hesitate to make additional significant investment in F-O infrastructure. [PacifiCorp et al]. Private businesses cannot expect a level playing field and cannot compete with federal advantages. [PacifiCorp et al]. [Puget]
- We find no authorization or federal mandate that permits Bonneville to participate in the communications arena other than for its own operational use." [Flathead Electric Coop] Bonneville has relied on communications provided by private telephone companies; could do so for fiber-optics; ownership and operation are not needed to carry out statutory function; Bonneville proposes to exceed its statutory authority. [PacifiCorp et al] It is up to Congress to determine whether fiber-optic investment is proper, not the Administrator. [PacifiCorp et al] Commenter wants detailed analysis of statutory authority [doubts it covers these actions]. [Puget]
- Bonneville's entering the fiber-optics arena is bad public policy. [PacifiCorp et al] [Puget]
- Bonneville is not subject to meaningful regulation [as are private providers of communications services]. [PacifiCorp et al] [Puget]
- Bonneville is increasing risks and costs for its transmission customers [unnecessarily]. [PacifiCorp et al.] [Avista] Where does this program provide rate stabilization? [Flathead]
- Others [TouchAmerica] have offered to provide service [at a low cost]; Bonneville has turned them down. [PacifiCorp et al]. [Puget]
- Bonneville has invested more than other PMAs (e.g., way above WAPA). [PacifiCorp et al]
- Bonneville's assertion that rural areas are underserved is unsupported (and will become self-fulfilling prophecy). [PacifiCorp et al] [Puget] Bonneville's "recall" policy for third parties would mean that rural communities would lose their fibers later. [PacifiCorp; footnote].

- PacifiCorp uses TSP similar to TouchAmerica proposal: " . . have enhanced [its] communication network and have lowered its communication costs."
- Bonneville "should divest its present investment in fiber-optic communication to the highest bidder and . . retain or back access to sufficient fiber-optic capacity to meet its system operation requirements. " ". . . should offer its right-of-way on a nondiscriminatory basis at a price that fully compensates Bonneville for such service [to include access to operational fiber]." [PacifiCorp, Puget] "Bonneville is taking this approach with cellular telephone facilities that are being installed on its rights-of-way . . . " [PacifiCorp et al] [Avista] "Providing access to fiber capacity at discounted rates to a particular class of service provider under the pretext of "public benefits" is clearly discriminatory, and unfairly places additional risk upon Bonneville's transmission customers. "[Avista] [Puget]
- Technology obsolescence will make it impossible for Bonneville to recover its costs [may not meet other parties' long-term communication requirements] [will therefore impose another burden on transmission customers to pay for excess capacity]. [PacifiCorp et al] [Puget]
- Costs per mile are much higher [cites $15,000 vs. $51,000 by TouchAmerica]. [Puget]
- Bonneville should share its business plan (more than just the Issue Paper) to those who are being forced into funding this endeavor." [Flathead] Commenter objects to heavily redacted copies of contracts and wants full disclosure so that they can make detailed comments on proposal. [Puget]
- Bonneville should have sought out public comment on these issues before launching into this "extraordinarily large" spending program. This is a continuing pattern of behavior. [Puget]
- Issue Paper offers limited ("false") choices. Fiber really for power system, not transmission, so PBL should bear large portion of costs. Ignores option of third-party installation and provision of "free" fiber for Bonneville operational needs. [Puget]
- The fiber program works out to a "10% increase in transmission revenue requirements. It has not been sufficiently demonstrated to us that the customers of Flathead Electric will receive enough additional benefits . . . to substantiate a 10% increase in transmission rates for this program alone." [Flathead]

APPENDIX C: Snapshots of Fiber-optics Needs in Bonneville's Future

Bonneville Power Administration

Snapshot 1: BPA Status 2008

- **RTO:** formed and is fully functional.
- **Energy Web** 2010: under way, not yet fully integrated.
- **Remote Meter Reading:** out of R&D, still being implemented.
- 80% circuits moved from **analog microwave to digital fiber.**
- Several major **fiber loops** are complete; smaller ring work has started.
- **Wide Area Measurement** implemented to synchronize the system.
- Some 500-kV **substations** retrofitted; new subs equipped for Mod Bus.
- **Regions:** maintenance instructions include video.
- **Video conferencing** prevalent across service territory.
- **Reliability Centered Maintenance** includes some transmission of real-time equipment diagnostic information. Some sensors are in place.
- Real-time systems begin to monitor the physical **safety** of the infrastructure. Video monitoring of sub-stations, lines, etc. beginning.

Predecisional - Proprietary Information
Attorney Work Product

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Bonneville Power Administration

Backbone Fiber Count: BPA at 2008

BPA Controls	2 fibers	
BPA RAS (sub to CC)	2 fibers (locked bandwidth)	
BPA TT (sub to sub)	2 fibers (locked bandwidth)	
BPA administrative	2 fibers	
Spares for growth	2 fibers	
Spares for breakage	2 fibers	
Total BPA		**12 fibers**
RTO (Communication and Scheduling)	4 fibers	
Total Fiber Usage		**16 fibers**

Note: Additional fibers temporarily in excess of operational needs will be leased. At least 4 leased fibers will be reserved for public benefits.

Predecisional - Proprietary Information
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Bonneville Power Administration

Snapshot 2: BPA Status 2018

- **RTO:** backbone for the Region. WPPSS debt retired; BPA transmission assets become part of RTO owner/operator. More RTO fibers needed for future upgrade. Geographic scope may be beyond PNW by now.
- **Energy Web** fully functional; **Remote Meter Reading** an integral part.
- All major **fiber-optic loops** in place; the system is 100% digital. Major rings divided into smaller rings, doubling fiber-optic use in backbone cables.
- **WAM** system has replaced most RAS; most **substations** MOD BUS.
- **Regional Offices:**equipped for a variety of highly interactive functions.
- **Controls:** Fully implemented: dams/substation security: video cameras, etc.
- 75% of **VHF** mountain-top repeaters are removed; VHF communications occur over low-power transmitters on every third tower.
- **Sensors** on fiber measure conductor temperature, sag; fully monitor equipment for RCM; operate our system more efficiently.
- **Control center**: Probing signals monitor the system for robustness and problems.

Bonneville Power Administration

Backbone Fiber Count: BPA at 2018

BPA Controls & RCM	2 fibers	
BPA RAS & WAM (locked) & Real Time System Modeling	6 fibers	
BPA TT (locked)	2 fibers	
BPA Administrative	2 fibers	
VHF	2 fibers	
Real Time Transmission Sensors	2 fibers	
System Monitoring and Testing	2 fibers	
Spares for growth	2 fibers	
Total BPA		**20 fibers**
RTO fibers	6 fibers	
Total Fibers		**26 Fibers**
Smaller Rings (2x)		
Sub-total Fibers		**52 fibers**
Spares for Breakage	6 fibers	
Undetermined future needs	6 fibers	
Final Total Fibers		**64 Fibers**

Note: Additional fibers temporarily in excess of operational needs will be leased. At least 4 leased fibers will be reserved for public benefits.

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Bonneville Power Administration

Snapshot 3: BPA Status 2025

All issues covered under Snapshot 2 Plus:

Additional/Change

- **The RTO** geographic scope may be as big as the Western Interconnection.
- **Smaller rings** in place.
- **Fiber breakage**: More significant as fiber ages and as weather works on it.
- **Future needs:** Increase number of fibers for undetermined future needs, such as fibers that may be extended to all Western States.

Bonneville Power Administration

Backbone Fiber Count: BPA at 2025

BPA Controls & RCM	2 fibers	
BPA RAS & WAM (locked) & Real Time System Modeling	6 fibers	
BPA TT (locked)	2 fibers	
BPA Administrative	2 fibers	
VHF	2 fibers	
Real Time Transmission Sensors	2 fibers	
System Monitoring and Testing	2 fibers	
Spares for growth	2 fibers	
Total BPA		**20 fibers**
RTO fibers	6 fibers	
Total Fibers		**26 Fibers**
Smaller Rings (2x)		
Sub-total Fibers		**52 fibers**
Spares for Breakage	12 fibers	
Undetermined future needs (RTO is backbone to the system)	12 fibers	
Final Total Fibers		**76 Fibers**

- **Note: At this point, there may be no opportunity to offer or continue public benefit fiber.**

APPENDIX D: Bonneville Fiber-optic and Transmission Routes